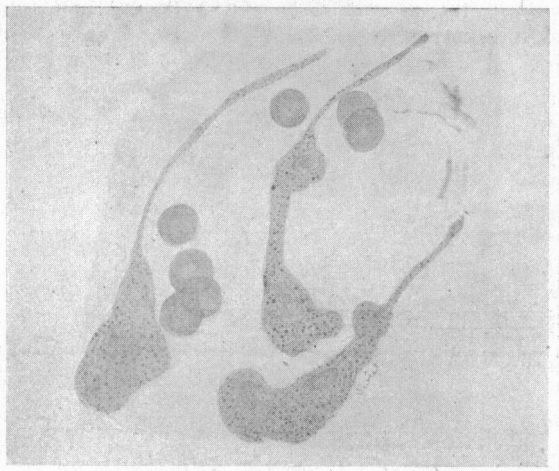
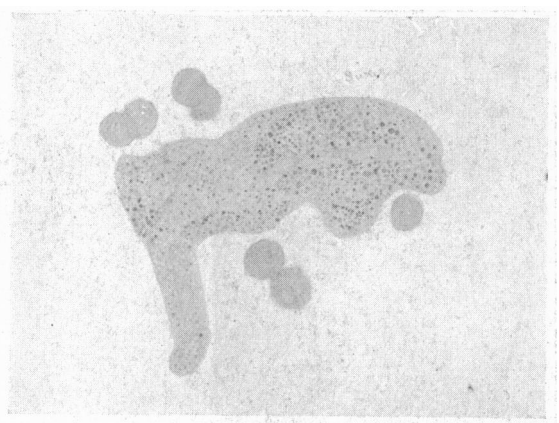
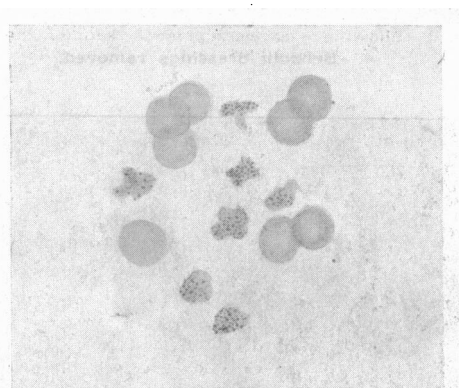


No. 4—Fantastic shapes assumed over period of ten minutes.



No. 5—Very active leucocyte. Note size compared with red cell.



No. 6—A minute leucocyte, very active.

In pus cells obtained from various sources, intestinal tract, arm, etc., it was possible to demonstrate motility in a few cells but of a different character entirely from that seen in the leucocytes from the blood. In the pus cell there appeared to be a change in shape but no flowing of the granules could be made out and there was no progression. A close scrutiny of these motile cells showed an occasional one extruding a distinct hyaline pseudopod. The nuclei were invisible in some of the motile pus cells and apparently they were polymorphonuclears.

The quesion naturally arises is it possible for the leucocyte under favorable conditions to show all of its characteristic motility after it has left the blood. If so it might explain many peculiar findings reported in the past, similar to the above mentioned bladder infection.

The probabilities are that sluggishly motile leucocytes, assuming as they do at times, bizarre forms are accountable for some of the reports of amebæ or ameboid bodies found in unusual locations.

The drawings were made by Mr. Sweet, medical artist, and are all from the blood.

350 Post street.

PLASTER CAST IMMOBILIZATION OF FRACTURES PRIOR TO OPEN OPERATION FOR REDUCTION OF SAME.

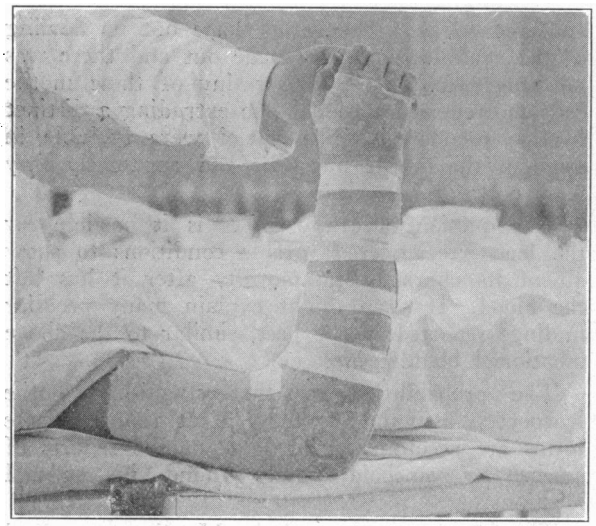
By NEWTON T. ENLOE, M D., Chico, Cal.

The object of this paper is to state briefly the advantage of immobilizing fractures in plaster casts a week before attempting the open operation for the reduction of same, and to give the technic of preparing the field of operation which has to date given 100 per cent. clean wounds.

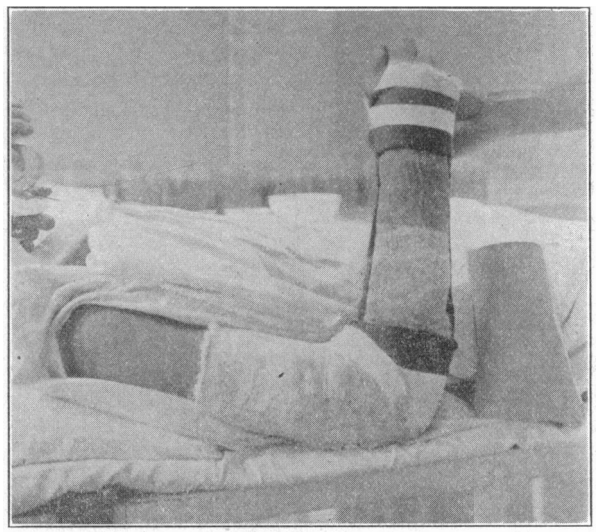
1. A great many fractures reduced by open operation can not be held in proper position after being reduced while the plaster Paris is being applied and allowed to harden, except when held together by some foreign material.

If we operate through a window of an already hardened cast the fracture, when reduced, will usually remain in position without the introduction of plates, screws, wire or other non-absorbable foreign material. This is a very great advantage. Any surgeon doing bone work knows well the disadvantage of using any of the many foreign materials and would prefer to leave them out when apposition can be maintained by any other means.

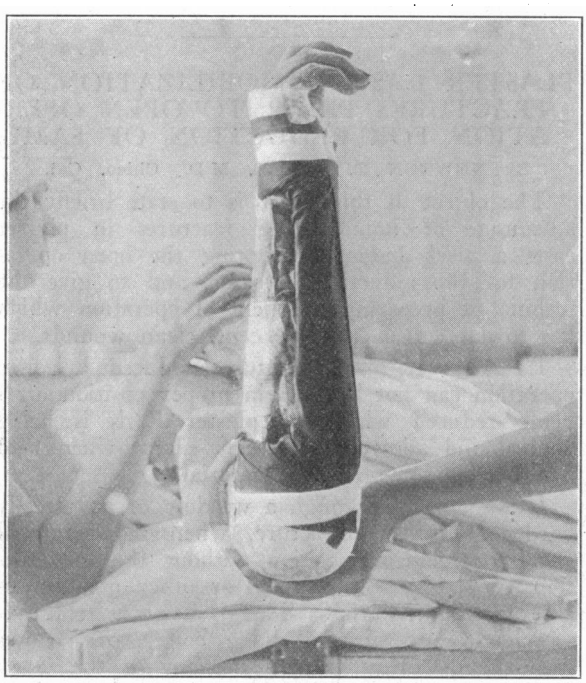
2. After the fracture is exposed we find the limb (or site of the fracture) is held firm by the cast extending above and below the joints nearest the fracture. This enables the surgeon to apply the lion-jaw forceps, or any other instrument he may choose, to reduce the fracture with very slight effort. The lower edge of the window through which the operation is being performed is a fulcrum upon which to rest the forceps. If extension be necessary and can not be given by an assistant by traction on the limb, an instrument can be placed between the forceps about three inches from the bone (the best instrument being a double end automobile wrench) and by bringing the handles of the forceps together the ends of the bones will separate; and by rocking in any direction desired on the lower edge of the window



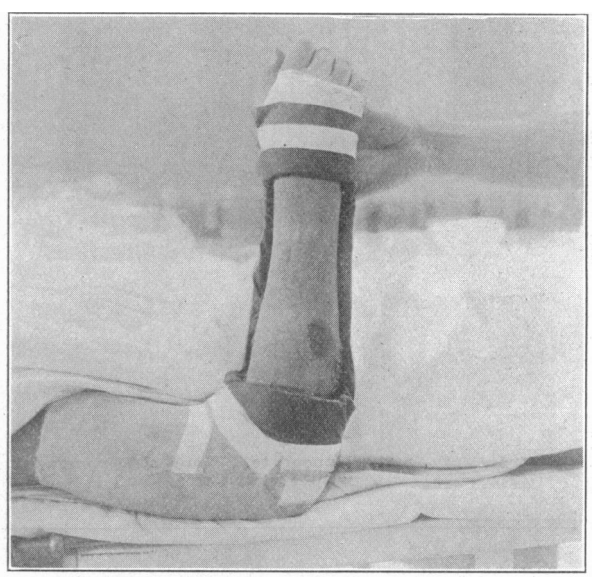
1. Closed cast showing window in position ready for operation.



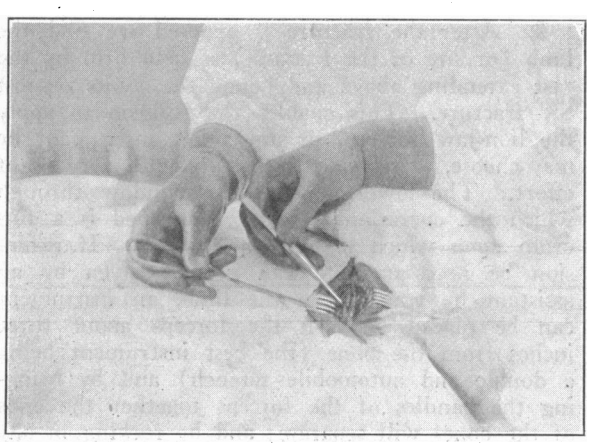
2. Window removed showing gauze saturated with benzoin.



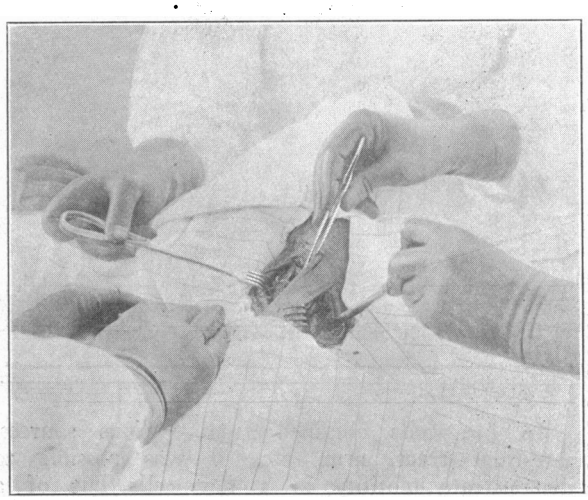
3. Rubber dam applied and held in position with adhesive plaster.



4. Benzoin dressings removed.



5. Shows ulna in position without use of any foreign material.



6. Operation in progress showing both ulna and radius exposed with ample room for work.

(fulcrum) there is practically no effort in placing the ends of the bones in perfect position. In the majority of cases they will remain so without internal fixation by any foreign material.

There is far less danger of injuring the bones or soft tissues with the forceps, for the reason that at all times one has complete control over the instrument instead of endeavoring to set the bone in midair with the flimsy support of assistants or the Hawley table.

I do not wish to give the impression that the Hawley table or assistants are not useful, since both are indispensable in the application of the cast preparatory to operation. Having the field of operation supported in plaster and the cast resting on a firm support, changes a very difficult task to a relatively simple procedure.

3. No surgeon, however skilled and experienced, can be sure that the cast he applies immediately after operation will not be so uncomfortable as to require readjustment such as may endanger his result. The application of the cast long enough before operation to permit it to dry thoroughly insures that immobilization will not have to be interfered with after operation on account of an uncomfortable cast. When our plan is followed the patient has had time to get over the initial period of discomfort during the first four or five days after the application of the cast before he comes to operation. If there should be anything wrong with the first cast applied, its removal and the application of another is a simple matter before operation,—not so afterward. Restlessness of the patient, due to cast discomfort, is a menace to the operative result, and this is avoided where the cast has been applied long enough before the operation for the patient to become accustomed to it. This is especially true when a body cast is used.

4. Probably the greatest advantage of applying the cast before operation is that it lessens the liability of infecting the field of operation. Anyone doing bone work knows how difficult it is to hold the towels and sheets in position when operating upon a fractured femur or humerus—in fact, any of the bones. The surgeon holds the fractured ends in midair with whatever clamps or forceps he prefers, and while the assistants hold the limb as steady as human help can, the surgeon just about gets the bones in position when some wave or motion (not the fault of anyone in particular) causes the bones to slip and drop out of position, probably just opposite to where they were originally. Every time they slip they wound tissue, sometimes injuring important vessels. During this strain the sterile dressings and sheets which once protected the field of operation, slip out of position and often unnoticed by the surgeon who is using all his energy, both mental and physical, to reduce and retain in position a fracture which, if operated through a window, would entail small effort.

The slipping of the sterile sheets is often the cause of infection; these sterile dressings can be sewed or clamped to the skin surrounding the field, but the extreme exertion required to reduce the fracture sometimes tears them loose.

5. Contrary to the first impression every surgeon seems to get, there is ample room in all cases to operate through a window. The limb is held firm in the cast and does not roll to and from the operator. Consequently, when working through a window there seems to be about twice as much room as in *the same sized incision* where no cast is used.

6. Just as soon as the operation is completed the anesthetic can be discontinued, the patient placed in bed without fear of undoing the surgeon's work or breaking the cast before it becomes firm.

THE TECHNIC EMPLOYED IN PREPARING THE FIELD OF OPERATION

The field is cleansed with soap and water and shaved. It is then thoroughly dried and covered with sterile gauze the size and shape of the proposed window. The gauze is then saturated with comp. tr. benzoin; sheet cotton is applied over the surface to be covered with the cast, and the cast applied, the limb being held in as nearly a normal position as possible. While the cast is hardening the window is cut but is allowed to remain in place. On the morning of the operation the window is removed, cotton cut away and pulled from the edges. Dental rubber dam is tucked under the cast on all four sides, stretched over the cast and held in place with adhesive strips. The benzoin-saturated gauze is removed and the field painted with tr. iodin and alcohol, equal parts. This is removed with 95 per cent. alcohol and sterile towels are tucked under the edges of the window and turned back over the cast. The other operating sheets are placed over the patient; the incision is made through the skin and superficial fascia and the towels sewed in to protect the wound from possible skin infection. The operation is then continued in the usual way.

Before beginning to close the wound tr. iodin and sterile water (10 per cent.) are used to cleanse the wound. It is then thoroughly dried and closed; comp. tr. benzoin dressing is used, the window replaced and held in place with bandages of adhesive plaster. If the wound be previously infected, it is first cleansed with tr. iodin and alcohol, equal parts, followed by alcohol and then sterile water. The wound is dried, filled with comp. tr. benzoin and closed, leaving a small opening for drainage, but no drains are used.

As a rule, the wound is not dressed for ten or twelve days, even though it has previously been necessary to dress it daily, provided of course that all points of infection have been reached by the solution.

In the last six months the author has had three cases of infected wounds with non-union of bones that have resulted favorably with the employment of the above technic. No case required more than three dressings, in spite of the fact that all of them had required dressings every other day for a month prior to operation.

SUMMARY

The advantages claimed for the above described method are:

1. Easy reduction during operation. (The cast provides a fulcrum for leverage.)

2. Danger of wounding the tissues by slipping of unsupported fragments is done away with.

3. The introduction of non-absorbable fixation materials is made unnecessary.

4. The danger of infection of the field by the slipping of dressings during operation is much diminished.

5. Postoperative comfort and quiet are assured.

6. The surgeon is saved much agony of spirit and waste of physical energy.

P. S.—Since writing this article I have dispensed with the sewing in of towels after making incision through skin and fascia, but instead paint with Tr. Benzoin Comp. with equally good results.

TRAUMA—ITS RELATION TO NERVOUS DISEASES OF UNDETERMINED PATHOLOGY*

By JOSEPH CATTON, M. D., San Francisco.

In assigning to trauma a causal place in relation to diseased conditions, it has too often been a fact that medical men have dealt with the subject with absolute empiricism. What has been true in this connection, as regards medicine in general, has been true, likewise, as regards neurological medicine. Physicians who are scientific, those who demand pathologic cause for symptomatic effect, must satisfy certain definite criteria in their minds before calling trauma a factor in the production of a given disease. This paper will consider but one of the class of nervous diseases, whose pathology has not yet been definitely and finally determined. Such consideration as is given to this particular disease and its relation to trauma, may be applied, in toto, to the other neurological conditions of undetermined pathology.

This communication concerns itself with the syndrome of tremor-rigidity-paralysis occurring in persons who present, neither clinically nor pathologically, lesions of the cortico-pyramidal or peripheral nervous mechanisms. This syndrome is seen most frequently, and reported as Paralysis Agitans, but it also forms the nucleus of the picture of Juvenile Paralysis Agitans, of progressive lenticular degeneration (Wilson) and of progressive atrophy of the globus pallidus (Hunt); and it may be added at times to certain other neurological pictures. The relation of trauma to these disease pictures will be considered. Further, trauma will be thought of in a narrow sense in order that there may be more of definiteness to the consideration and a greater possibility of agreement as to certain of the relationships.

Trauma, then, will refer to physical injury rather than to either psychical shock or any one of the unlimited number of generalized diseased conditions which might be included in a more comprehensive idea of trauma. While neurologists are interested in the relation of trauma to neurological conditions, including Paralysis Agitans, from the academic and the scientific standpoints only, they may be satisfied with slow progress and withhold opinion indefinitely about these relationships. However, in certain instances, for example when a case is to come before an Industrial Accident Commission or a court, if physicians do not have definite opinions, or if their opinions are at variance, then the lay judge, jury or board can, and will decide that trauma did or did not cause the Parkinson, or other neurological pictures, as the case may be. It would seem, therefore, very proper to check up the scientific data on such relations as are under consideration. Industrial medicine makes these problems immediate; medical men should solve them. Two cases are presented for discussion this evening.

Case A. Male, age 51, white, American; lumberman. Family and past history not remarkable. Cut his middle and ring fingers, right, with a circular saw, March 6, 1920. On March 8, 1920, he was given general ether anesthetic, and fingers amputated. It was reported that he came out of the anesthetic poorly, and had Cheyne-Stokes breathing and was semi-conscious for some time; that during the next day it was possible to arouse him, but if he were left alone he would lapse into a comatose state. On the second day he became entirely conscious, but was noted to be stupid, and to have had a marked slowing of all his mental processes. His blood pressure was found to be low, but there were no other remarkable findings. Soon there came a weakness of his right arm, and then of his left arm and the lower extremities. The weakened members began to show some rigidity. One examiner reported on April 30, 1920, positive Wassermann in blood serum, and that the spinal fluid showed pressure of 400, 54 cells and positive Nonne, Noguchi and Ross Jones tests, and positive Wassermann. He administered a few doses of salvarsan. He felt the case was one of early paresis. On May 21, 1920, another examiner found the symptoms to be due to organic brain disease, but could not confirm paresis. He reported negative Wassermann in the blood serum, and spinal fluid negative to all tests. He was seen first by present examiner on August 24, 1920. He complained of the slowing of his mental processes, of occasional night sweats, hot feelings, slight deafness in right ear, stiffness of legs and dragging of feet, stiffness in arms, difficulty to start or to stop walking, had early repeated incontinence of urine; has become costive; had crying spells; did not speak much; a nocturea of i to ii increased to iii after the accident and operation; there had been some oedema of feet during two months. He denied having had any of the muscular symptoms before. Likewise, he denied at time of examination that he had any other remarkable symptoms. Physical examination showed him to look six years older than the stated age, fifty-one; greasy skin on face, losing hair, almost all teeth missing, accentuated second aortic heart sound, B. Pr. 123-83, partial amputation of middle and ring fingers, right, and no other findings. He showed some deafness in both ears, mainly right. Mask face, generalized muscular weakness, very slow voluntary movements, generalized rigidity of musculature of extremities, trunk and neck, the rigidity being most marked in the order, right arm, left arm and left leg. There was a slight increase in muscular irritability. No tremor was present, but at times the patient moved his thumb right across his index finger in a manner not unlike the excursion of the paralysis agitans tremor. At other times he drummed with his index and middle fingers of each hand. There was some slight swaying on testing Romberg, but no other changes in sensory examinations. His achilles jerks were not gotten, otherwise all reflexes were present and normal, and there were no pathological pyramidal tract signs. The psychiatric studies brought out the marked slowing of cerebral processes, especially of motor initiation. His wife stated that he had grown childish; there was some dysarthria. The urine at times has shown small amount of albumin. The other laboratory findings have already been mentioned.

The case has been seen at intervals since; the condition has been practically stationary, but the

* Read before the San Francisco Neurological Society, April 1, 1921. From the Department of Neurology, Stanford University Medical School.